C# Unit Tests

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Home

1. Introduction

It's about the main unit test framework used for C#

Testing on Microsoft Site

2. Frameworks

2.1. xUnit

xUnit is a free, open-source, community-focused unit testing tool for .NET. The original inventor of NUnit v2 wrote xUnit.net. xUnit.net is the latest technology for unit testing .NET apps. It also works with ReSharper, CodeRush, TestDriven.NET, and Xamarin. xUnit.net is a project of the .NET Foundation and operates under its code of conduct.

2.2. NUnit

NUnit is a unit-testing framework for all .NET languages. Initially, NUnit was ported from JUnit, and the current production release has been rewritten with many new features and support for a wide range of .NET platforms. It's a project of the .NET Foundation.

2.3. MS Test

MSTest is the Microsoft test framework for all .NET languages. It's extensible and works with both .NET CLI and Visual Studio

3. Unit tests - How to

3.1. NUnit

[Unit Testing with NUnit on Microsoft Site](#)

[NUnit Documentation](#)

Visual Studio Test Adapter

The NUnit 3 Test Adapter allows you to run NUnit 3 tests inside Visual Studio or with dotnet on the command line.

3.1.1. Set Up Test for .net (core) framework

- Create a test library.

- NUnit framework

```
install-Package NUnit -Version 3.13.3
```

```
        Install from package manager console (visual studio)
        PM> Install-Package NUnit -Version 3.13.3
        Restoring packages for D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj...
        GET https://api.nuget.org/v3-flatcontainer/nunit/index.json
        OK https://api.nuget.org/v3-flatcontainer/nunit/index.json 122ms
        GET https://api.nuget.org/v3-flatcontainer/nunit/3.13.3/nunit.3.13.3.nupkg
        OK https://api.nuget.org/v3-flatcontainer/nunit/3.13.3/nunit.3.13.3.nupkg 8ms
        Installed Microsoft.NETCore.Platforms 1.1.0 from C:\Program Files
(x86)\Microsoft SDKs\NuGetPackages\ with content hash
kz0PEW2lhqygehI/d6XsPCQzD7ff7gUJaVGPVETX611eadGsA3A877GdSlU0LRVMCTH/+P3o2iDTak+S08V2+A
==.
        Installed NUnit 3.13.3 from https://api.nuget.org/v3/index.json with content
hash
KNPDpls6EfHwC3+nnA67fh5wpxeLb3VLFAfLxrug6JMYDLHH6InaQIWR7Sc3y75d/9IKzMksH/gi08W7XWbmnQ
==.
        Installed NETStandard.Library 2.0.0 from C:\Program Files (x86)\Microsoft
SDKs\NuGetPackages\ with content hash
7jnbRU+L08FXKMxqUflxEXtVymWvNOrS8yHgu9s6EM8Anr6T/wIX4nZ08j/u3Asz+tCufp3YVwFSEvFTPYmBPA
==.
        Installing NuGet package NUnit 3.13.3.
        Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\PocHelperLi
braryTest.csproj.nuget.g.props.
        Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\PocHelperLi
```

```
braryTest.csproj.nuget.g.targets.
        Writing assets file to disk. Path: D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\project.ass
ets.json
        Restored D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj (in 3.9 sec).
        Successfully installed 'Microsoft.NETCore.Platforms 1.1.0' to
PocHelperLibraryTest
        Successfully installed 'NETStandard.Library 2.0.0' to PocHelperLibraryTest
        Successfully installed 'NUnit 3.13.3' to PocHelperLibraryTest
        Executing nuget actions took 297 ms
        Time Elapsed: 00:00:04.5083532
```

- NUnit Test Adapter

```
Install-Package NUnit3TestAdapter -Version 4.3.1
```

```
        PM> Install-Package NUnit3TestAdapter -Version 4.3.1
        Restoring packages for D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj...
        GET https://api.nuget.org/v3-flatcontainer/nunit3testadapter/index.json
        OK https://api.nuget.org/v3-flatcontainer/nunit3testadapter/index.json 157ms
        GET https://api.nuget.org/v3-
flatcontainer/nunit3testadapter/4.3.1/nunit3testadapter.4.3.1.nupkg
        OK https://api.nuget.org/v3-
flatcontainer/nunit3testadapter/4.3.1/nunit3testadapter.4.3.1.nupkg 9ms
        Installed NUnit3TestAdapter 4.3.1 from https://api.nuget.org/v3/index.json
with content hash
R+bGFtsUpLWywjT1nb3xMmoVa2AIw6ClIGC+XjW9lYE8hwJeos+NdR/mtg4RXbBphmC9epALrnUc6MM7mUG8+Q
==.
        Installing NuGet package NUnit3TestAdapter 4.3.1.
        Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\PocHelperLi
braryTest.csproj.nuget.g.props.
        Writing assets file to disk. Path: D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\project.ass
ets.json
        Restored D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj (in 376 ms).
        Successfully installed 'NUnit3TestAdapter 4.3.1' to PocHelperLibraryTest
        Executing nuget actions took 146 ms
        Time Elapsed: 00:00:00.5394086
```

- NUnit Test SDK

```
Install-Package Microsoft.NET.Test.Sdk
```

```
      PM>
      Restoring packages for D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj...
          GET https://api.nuget.org/v3-flatcontainer/microsoft.net.test.sdk/index.json
          OK https://api.nuget.org/v3-flatcontainer/microsoft.net.test.sdk/index.json
135ms
          GET https://api.nuget.org/v3-
flatcontainer/microsoft.net.test.sdk/17.4.1/microsoft.net.test.sdk.17.4.1.nupkg
          OK https://api.nuget.org/v3-
flatcontainer/microsoft.net.test.sdk/17.4.1/microsoft.net.test.sdk.17.4.1.nupkg 7ms
          GET https://api.nuget.org/v3-
flatcontainer/microsoft.testplatform.testhost/index.json
          GET https://api.nuget.org/v3-flatcontainer/microsoft.codecoverage/index.json
          OK https://api.nuget.org/v3-
flatcontainer/microsoft.testplatform.testhost/index.json 122ms
          GET https://api.nuget.org/v3-
flatcontainer/microsoft.testplatform.testhost/17.4.1/microsoft.testplatform.testhost.1
7.4.1.nupkg
          OK https://api.nuget.org/v3-
flatcontainer/microsoft.testplatform.testhost/17.4.1/microsoft.testplatform.testhost.1
7.4.1.nupkg 8ms
          OK https://api.nuget.org/v3-flatcontainer/microsoft.codecoverage/index.json
146ms
          GET https://api.nuget.org/v3-
flatcontainer/microsoft.codecoverage/17.4.1/microsoft.codecoverage.17.4.1.nupkg
          OK https://api.nuget.org/v3-
flatcontainer/microsoft.codecoverage/17.4.1/microsoft.codecoverage.17.4.1.nupkg 8ms
          GET https://api.nuget.org/v3-
flatcontainer/microsoft.testplatform.objectmodel/index.json
          GET https://api.nuget.org/v3-flatcontainer/newtonsoft.json/index.json
          OK https://api.nuget.org/v3-
flatcontainer/microsoft.testplatform.objectmodel/index.json 119ms
          GET https://api.nuget.org/v3-
flatcontainer/microsoft.testplatform.objectmodel/17.4.1/microsoft.testplatform.objectm
odel.17.4.1.nupkg
          OK https://api.nuget.org/v3-
flatcontainer/microsoft.testplatform.objectmodel/17.4.1/microsoft.testplatform.objectm
odel.17.4.1.nupkg 7ms
          OK https://api.nuget.org/v3-flatcontainer/newtonsoft.json/index.json 141ms
          GET https://api.nuget.org/v3-
flatcontainer/newtonsoft.json/13.0.1/newtonsoft.json.13.0.1.nupkg
          OK https://api.nuget.org/v3-
flatcontainer/newtonsoft.json/13.0.1/newtonsoft.json.13.0.1.nupkg 8ms
          GET https://api.nuget.org/v3-flatcontainer/nuget.frameworks/index.json
          OK https://api.nuget.org/v3-flatcontainer/nuget.frameworks/index.json 122ms
          GET https://api.nuget.org/v3-
```

```
flatcontainer/nuget.frameworks/5.11.0/nuget.frameworks.5.11.0.nupkg
        OK https://api.nuget.org/v3-
flatcontainer/nuget.frameworks/5.11.0/nuget.frameworks.5.11.0.nupkg 8ms
        Installed Microsoft.NET.Test.Sdk 17.4.1 from
https://api.nuget.org/v3/index.json with content hash
kJ5/v2ad+VEg1fL8UH18nD71Eu+Fq6dM4RKBVqlV2MLSEK/AW4LUkqlk7m7G+BrxEDJVwPjxHam17nldxV80Ow
==.
        Installed NuGet.Frameworks 5.11.0 from https://api.nuget.org/v3/index.json
with content hash
eaiXkUjC4NPcquGWzAGMXjuxvLwc6XGKMptSyOGQeT0X70BUZObuybJFZLA0OfTdueLd3US23NBPTBb6iF3V1Q
==.
        Installed System.Reflection.Metadata 1.6.0 from C:\Program Files
(x86)\Microsoft SDKs\NuGetPackages\ with content hash
COC1aiAJjCoA5GBF+QKL2uLqEBew4JsCkQmoHKbN3TlOZKa2fKLz5CpiRQKDz0RsAOEGsVKqOD5bomsXq/4STQ
==.
        Installed Newtonsoft.Json 13.0.1 from https://api.nuget.org/v3/index.json with
content hash
ppPFpBcvxdsfUonNcvITKqLl3bqxWbDCZIzDWHzjpdAHRFfZe0Dw9HmA0+za13IdyrgJwpkDTDA9fHaxOrt20A
==.
        Installed Microsoft.TestPlatform.TestHost 17.4.1 from
https://api.nuget.org/v3/index.json with content hash
K7QXM4P4qrDKdPs/VSEKXR08QEru7daAK8vlIbhwENM3peXJwb9QgrAbtbYyyfVnX+F1m+1hntTH6aRX+h/f8g
==.
        Installed Microsoft.TestPlatform.ObjectModel 17.4.1 from
https://api.nuget.org/v3/index.json with content hash
v2CwoejusooZa/DZYt7UXo+CJOvwAmqg6ZyFJeIBu+DCRDqpEtf7WYhZ/AWii0EKzANPPLU9+m148aipYQkTuA
==.
        Installed Microsoft.CodeCoverage 17.4.1 from
https://api.nuget.org/v3/index.json with content hash
T21KxaiFawbrrjm0uXjxAStXaBm5P9H6Nnf8BUtBTvIpd8q57lrChVBCY2dnazmSu9/kuX4z5+kAOT78Dod7vA
==.
        Installing NuGet package Microsoft.NET.Test.Sdk 17.4.1.
        Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\PocHelperLi
braryTest.csproj.nuget.g.props.
        Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\PocHelperLi
braryTest.csproj.nuget.g.targets.
        Writing assets file to disk. Path: D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\project.ass
ets.json
        Restored D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj (in 1.86 sec).
        Successfully installed 'Microsoft.CodeCoverage 17.4.1' to PocHelperLibraryTest
        Successfully installed 'Microsoft.NET.Test.Sdk 17.4.1' to PocHelperLibraryTest
        Successfully installed 'Microsoft.TestPlatform.ObjectModel 17.4.1' to
PocHelperLibraryTest
        Successfully installed 'Microsoft.TestPlatform.TestHost 17.4.1' to
PocHelperLibraryTest
        Successfully installed 'Newtonsoft.Json 13.0.1' to PocHelperLibraryTest
```

```
         Successfully installed 'NuGet.Frameworks 5.11.0' to PocHelperLibraryTest
         Successfully installed 'System.Reflection.Metadata 1.6.0' to
PocHelperLibraryTest
         Executing nuget actions took 114 ms
         Time Elapsed: 00:00:02.6533052
```

Sample image on references:
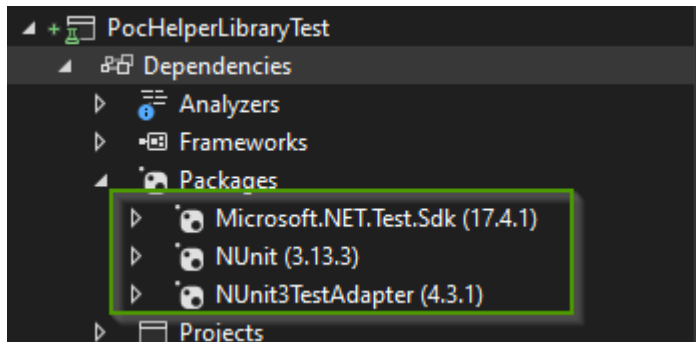
- Add reference from the library to test to the test libary

- Add [TestFixture] attribute to class that contains tests

- Add [Test] attribute to the methods that define tests
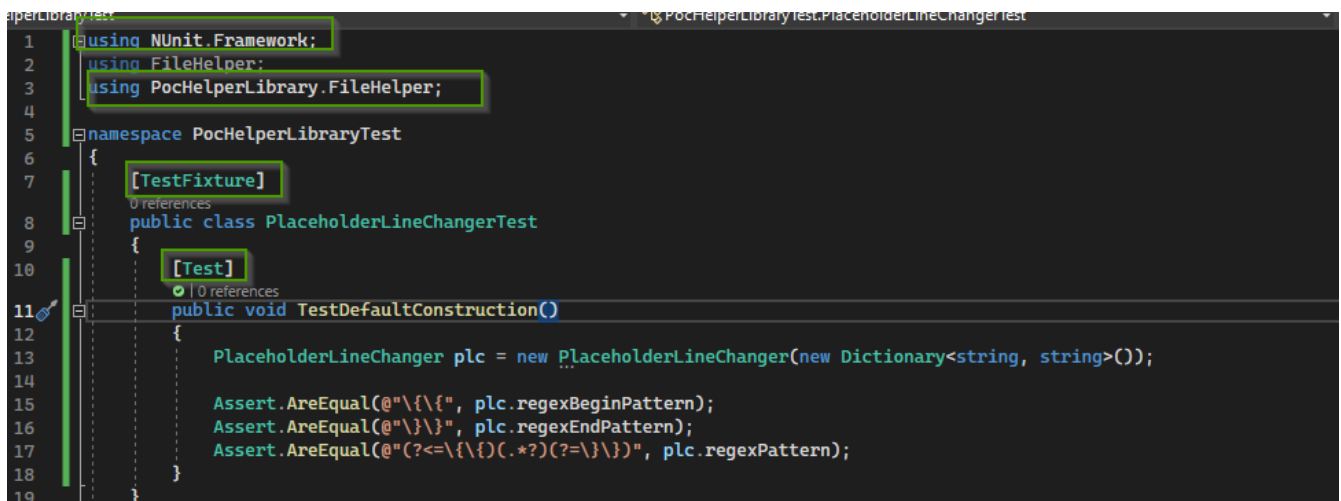
- To test internal classes set them visible on the assembly

  ◦ Add AssemblyInfo.cs file. On new core project the file is not generated by default.

Installed

C# Items
    Code
    Data
    General
    ▷ Web
  Graphics

▷ Online

Sort by: Default

Class		C# Items
Interface		C# Items
Component Class		C# Items
ADO.NET Entity Data Model		C# Items
Application Configuration File		C# Items
Application Manifest File (Windows Only)		C# Items
Assembly Information File		C# Items
Bitmap File		C# Items
Code Analysis Rule Set		C# Items
Code File		C# Items
Cursor File		C# Items
DataSet		C# Items
Debugger Visualizer		C# Items
editorconfig File (.NET)		C# Items

Name: AssemblyInfo1.cs

- Add the following line to the file

```
[assembly: InternalsVisibleTo("LaSdeCSharpLibraryTest")]
```
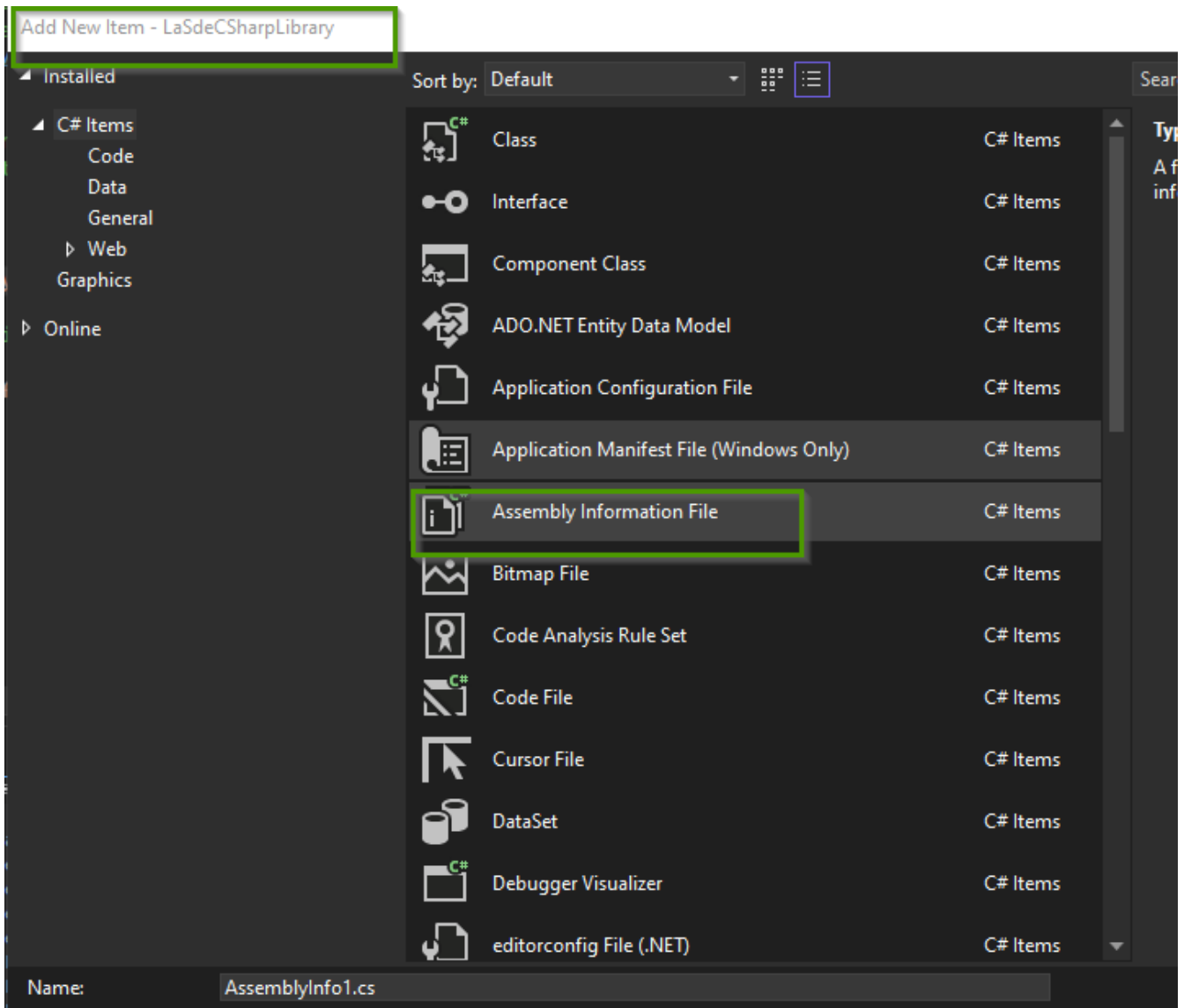
```
AssemblyInfo.cs    LaSdeCSharpLibrary.csproj*    LaSdeCSharpLibraryTest.csproj    FileRepositoryException.cs    FileElement.cs    Clas
C# LaSdeCSharpLibrary
 1   using System.Runtime.CompilerServices;
 2   using System.Runtime.InteropServices;
 3
 4   // In SDK-style projects such as this one, several assembly attributes that were historically
 5   // defined in this file are now automatically added during build and populated with
 6   // values defined in project properties. For details of which attributes are included
 7   // and how to customise this process see: https://aka.ms/assembly-info-properties
 8
 9
10   // Setting ComVisible to false makes the types in this assembly not visible to COM
11   // components.  If you need to access a type in this assembly from COM, set the ComVisible
12   // attribute to true on that type.
13
14   [assembly: ComVisible(false)]
15   [assembly: InternalsVisibleTo("LaSdeCSharpLibraryTest")]
16
17   // The following GUID is for the ID of the typelib if this project is exposed to COM.
18
19   [assembly: Guid("4cff184d-b1a6-473d-9974-472087bf52f2")]
20
```